

ELECTRICAL CONNECTION APPARATUS

BACKGROUND

5 1. Field of the Invention

This instant invention relates to the general field of cables and terminals for automotive type batteries. More specifically, it describes novel designs for cables, battery posts/terminals, and terminal connectors.

10 2. Prior Art in the Field

Present automotive batteries have terminals that serve as points of connection for electrical cables. These terminals may have side terminals, top terminals and, in an increasing number of cases, both. As is true with most electrical connectors, terminals may also be classified as male or female in configuration. Top terminals are generally "male" and are formed from immovable posts, whereas side terminals are generally "female" and are formed by an indentation adapted to receive a bolt (typically a bolt 1/4 inch in width and 3/8 inches in depth). Due to this difference, the nature of the connectors at the ends of electrical cables also vary depending on whether the cable is to be connected to a top post or to a side terminal. Connectors for a top post are generally formed from a "C" shaped "female" element that fits over the post and is tightened thereon by tightening down on a bolt that extends between (and connects) the two ends of the aforesaid element. Connectors for side terminals are usually formed from a simple perforated disk in combination with an appropriately sized bolt. The aforesaid bolt is placed through the perforation in the disk and screwed

snugly into the side terminal, serving as the "male" element in the connective combination and creating an electrically conductive connection between the cable and the side terminal.

The aforesaid features lead to a basic matching problem:

5 Cables with "female" connectors adapted for connection to a "male" top post cannot normally be used with a "female" side terminal battery and vice versa. The more recent introduction of a battery having both side terminals and top posts provides a partial solution for this problem; however, there is still need for simple
10 means for connecting the more standard "female" cable connectors with "female" side terminals where necessary. Moreover, there is a continuing need for connectors and terminals that are easier to use, and for terminals that are easier to connect to "jumper" cables than those in current use.

15 SUMMARY AND OBJECTS OF THE INVENTION

The instant invention encompasses a revolutionary new design for cables, terminal connectors and side terminals for automotive batteries. As to cables, it involves the production of cables in which each cable (positive or negative) branches into two ends having two connectors. This allows simultaneous connection to both the top and the side pole having the same polarity on a battery having both top and side poles. As to terminal connectors, it encompasses a unitary design having a terminal/bolt element that can be used for (i) the easy tightening/loosening of a female connector element to/from a top/post terminal while serving simultaneously as an ideal jumper cable connection location, (ii)

easy insertion into and/or removal from a side terminal aperture while serving simultaneously as an ideal jumper cable connection location, and (iii) when inserted in a side terminal aperture, creates a "male" post, allowing connection of standard top terminal post connectors to a side post battery. Moreover, the designs discussed herein are economical in construction, rugged and well adapted for ease of manufacture and use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a basic split cable design as taught by this invention.

FIG. 2 provides a perspective view of the basic connector element clamp taught by this invention.

FIG. 3 provides a perspective view of the basic connector element bolt taught by this invention.

FIG. 4 provides a top view of the basic connector element bolt taught by this invention.

FIG. 5 provides a top view of an alternative design for a connector element bolt as taught by this invention.

FIG. 6 provides a perspective view of an alternative design for a connector element bolt as taught by this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As illustrated in FIG. 1, the preferred embodiment of the cable utilized in the instant invention for use with batteries having both top and side terminals would be split so that both the positive cable (denoted generally by arrow 1) and the negative cable (not illustrated) branch into two terminal connector ends--

first connector end 2a and second connector end 2b--for connection to, respectively, the top and side terminals of a battery. The branch location (indicated generally as that portion of the cable 1 in the circle denoted by arrow 3) may be in the form of a "Y" or 5 a "T" or any other convenient configuration for this purpose. The branch location 3 may be advantageously formed utilizing a crimped multi-wire connection, a woven connection, or by other means well known in the art. As is typical in the art, the cable 1 is comprised of a conducting core 1a and an insulating sheath 1b

10 The first connector end 2a may be fitted with a standard top terminal connector fitting (as known in the art) and the second connector end 2b fitted with a standard side terminal connector 5. However, it is deemed more advantageous to fit at least the first connector end 2a for the top terminal (and preferably both first connector end 2a and second connector end 2b) with a connector element (denoted generally by arrow 4) adapted for use with the novel connector element bolt 6 taught in this invention. This connector element 4 may advantageously take the form of a "C" shaped clamp with a rounded portion 4a and extended tabs 4b having blank perforation 4c and threaded perforation 4d. The perforations 4c and 4d are adapted for insertion and screw tightening of the basic connector element bolt described below with reference to 15 FIGS. 3 and 4. Thus, although both perforation 4c and 4d necessarily have a diameter of approximately 1/4 inch, the connector element bolt is initially inserted through blank perforation 4c, and is next threaded through threaded perforation 20 25

4d (which is self tapped), allowing tightening of the connection. (Alternatively, a nut may be welded or otherwise affixed in place of threaded perforation 4d, allowing both perforations to be blank perforations). The extended tabs 4b should be of such length (and
5 the perforations 4c and 4d spaced outwardly from the rounded portion 4a on said extended tabs 4b at such distance) as to allow the enlarged head section 6b of the basic connector element bolt 6b to snugly abut the extended tabs 4b when tightened. For the embodiment illustrated, perforations 4c and 4d would, therefore,
10 need to be spaced outwardly from rounded portions 4a on extended tabs 4b approximately 1/2 inch and spaced upwardly from the base of the battery by approximately 1/2 inch. Supporting braces (not shown) may also be added between curved portion 4a and extended tabs 4b to eliminate folding of the tabs 4b upon tightening.

15 As illustrated in FIGS. 3 and 4, the basic connector element bolt (denoted by arrow 6) taught by this invention has both (i) a standard screw threaded section 6a at least 3/8 inches in length and 1/4 inches in width (which is adapted to fit into the side terminal of a battery), and (ii) an enlarged head section 6b approximately 3/4 inches in diameter and 3/4 inches in length
20 (which gives it the approximate dimensions of a standard top post for a battery). The head section 6b may advantageously be formed in a standard cylindrical configuration with cylindrical perforations (denoted by arrows 6c) as illustrated in FIGS. 3 and
25 4. (This embodiment is preferred as it may be utilized to create an "top post" configuration by insertion into a side terminal

aperture as well as being used for the other purposes discussed in this invention). An alternative "winged" configuration is illustrated in FIGS. 5 and 6. The winged configuration is provided with wings 8 and a base disk 9 as well as sharing numerous other features denominated and discussed with reference to the first embodiment described.

Both configurations should ideally be provided with grooves or some other form of texturing (denoted generally by arrow 7) on their outer surface to provide a stronger gripping surface for wrench or pliers and to form a superior conducting contact surface for jumper cable connectors. In both embodiments ease of tightening and loosening is facilitated by the inclusion of cylindrical perforations 6c which serve as means for insertion of a screw driver barrel or other cylindrical tool. (They may, therefore, be tightened and loosened without wrench or pliers, although these may also be used in the alternative if desired). This allows the user, who often has a limited number of tools available, especially in an emergency situation, to loosen or tighten connector element bolt 6 using a screw driver, a nail or almost any other linear tool that can serve as a lever arm and provide mechanical advantage to the user. This feature greatly facilitates the use and removal of the elements illustrated, eliminating many of the major inconveniences associated with current designs. The two embodiments for a connector element bolt 6 shown should, however, be considered as illustrative rather than exhaustive of design possibilities. Numerous shapes may be used

for this purpose, including multi-winged designs.

As previously noted, the threaded section 6a of the connector element bolt 6 is adapted by its size to screw into the side terminal of a standard battery. Thus, connector element bolt 6 is
5 designed to provide a substitute for the bolt typically utilized to fasten the standard side terminal connector 5 thereto, and to provide a shape and features that are (i) more easily tightened/loosened, and (ii) more adapted for connection of jumper cables. Likewise, when used in conjunction with the "C" shaped clamp 4
10 designed for attachment to the top terminal of a battery, they provide these same features in this role. Finally, when utilized with the preferred dual terminus cable design illustrated in FIG. 1, they constitute a complete and novel system for cables and terminals that offer numerous advantages over the designs in
15 current use. However, as with all inventions, many variations are possible without exceeding the ambit of the inventive concept. Thus, the exact nature of the invention claimed is to be derived from the claims that follow.

CLAIMS

20 I claim:

1. An electrical connection apparatus for automotive type batteries, comprising:
 - (a) an electrical cable having one end that branches to form two terminal connection ends; and
 - 25 (b) terminal connection means located at each of said two terminal connection ends.